27. (Cancelled) The substrate of claim 23, wherein the silicon carbide layer is produced by the process of providing a methylsilane flow rate of between about 30 to about 500 sccm, a helium or argon gas flow rate of between about 100 to about 2000 sccm, a chamber pressure of about 3 to about 10 Torr, an RF power source supplying a power density of about 4.3 to about 10.0 watts per square inch to an anode and cathode in the chamber, a substrate surface temperature of between about 200°C to about 400°C, and a showerhead to substrate surface spacing of between about 300 to about 600 mils.

Please add new claim 28 as follows:

28. (New) The method of claim 1, wherein the metal barrier layer comprises a material selected from the group of tantalum, tantalum nitride, titanium, titanium nitride, and combinations thereof.

REMARKS

This is intended as a full and complete response to the Office Action dated March 20, 2002, having a shortened statutory period for response set to expire on June 20, 2002. Claims 1 – 8, 10 – 13 and 15 - 27 are pending in the application. Claims 23 – 27 stand withdrawn from consideration by the Examiner. Claims 1 – 8, 10 – 13 and 15 – 22 were considered by the Examiner and stand rejected. Applicants cancel claims 22 – 27 without prejudice. Applicants present new claim 28 for consideration by the Examiner. Applicants believe that no new matter has been introduced in this response.

Claims 1 – 8 and 10 – 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Endo et al.* '150 and Europe '440, of record. The Examiner asserts that it would have been within the scope of one of ordinary skill in the art to combine the teachings of *Endo et al.* '150 and Europe '440 to enable the formation of the SiC layers of Europe '440. Applicants respectively traverse this rejection.

Endo et al. '150 discloses a process for depositing silicon carbide on a substrate. The substrate may be metallic, such as aluminum material. Europe '440 discloses depositing a silicon carbon barrier layer on a metal surface, between two metal layers to prevent interlayer diffusion, or between a metal and a dielectric material to prevent diffusion of the metal into the dielectric material.

Endo et al. '150 and Europe '440 do not disclose depositing a barrier layer of a metal on a silicon carbide barrier layer prior to the depositing of a metal layer. Examples of metal barrier layer materials include tantalum (Ta) tantalum nitride (TaN), titanium (Ti), titanium nitride (TiN). (See page 3, lines 23 – 25, Figure 1; and page 11, lines 15 – 27, and Figure 4).

Endo et al. '150 and Europe '440, either alone or in combination, do not teach, show, or suggest depositing a silicon carbide barrier layer on the substrate by a method comprising introducing an alkylsilane and a noble gas into a chamber, initiating a plasma in the chamber, and reacting the alkylsilane in the presence of the plasma to form silicon carbide, depositing a metal barrier layer on the silicon carbide barrier layer, and depositing a metal layer over the metal barrier layer, as recited in claim 1, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 15-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Endo et al.* '150 and Europe '440 as applied to claims 1 – 8 and 10-13 and further in view of Applicant's admitted prior art and either one of *Zhao* and *Somekh*. The Examiner asserts that it would have been within the scope of one or ordinary skill in the art to combine the teachings of *Endo et al.* '150 and Europe '440 with the etch stops of *Somekh* and *Zhao* to enable the formation of the structure of Figure 1. Applicants respectfully traverse this rejection.

Endo et al. '150 discloses a process for depositing silicon carbide on a substrate. The substrate may be metallic, such as aluminum material. Europe '440 discloses depositing a silicon carbon barrier layer on a metal surface, between two metal layers to prevent interlayer diffusion, or between a metal and a dielectric material to prevent diffusion of the metal into the dielectric material and insulate layers of wiring.

Somekh discloses depositing a carbon based etch stop, such as a diamond like amorphous carbon and fluorocarbon, having a low dielectric constant in a method for forming a dual damascene structure. *Zhao* discloses depositing a etch stop over a low k dielectric layer, and the dielectric layer may comprise a variety of dielectric materials including silicon carbide.

There is no suggestion or motivation in *Endo et al.* '150, Europe '440, *Somekh,* and *Zhao,* either alone or in combination, to disclose depositing a silicon carbide barrier layer on the substrate by a method comprising, introducing an alkylsilane and a noble gas into a chamber, initiating a plasma in the chamber, and reacting the alkylsilane in the presence of the plasma to form silicon carbide, depositing a first dielectric layer on the silicon carbide layer, depositing a silicon carbide etch stop having an etch selectivity ratio of at least about 40 to 1 on the first dielectric layer by a method comprising, introducing an alkylsilane and a noble gas into a chamber, initiating a plasma in the chamber, and reacting the alkylsilane in the presence of the plasma to form silicon carbide, patterning the silicon carbide etch stop, depositing a second dielectric layer on the silicon carbide etch stop, etching the first dielectric layer and the second dielectric layer to form a feature definition, depositing a tantalum nitride barrier layer in the feature definition, depositing a copper layer over the tantalum nitride layer to fill the feature definition, and depositing a silicon carbide passivation layer on the copper layer. Therefore, *Endo et al.* '150, Europe '440, *Somekh,* and *Zhao,* either alone or in combination, do not teach, show, or suggest claimed aspects of the invention. Withdrawal of the rejection is respectfully requested.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the claimed aspects of the invention. Having addressed all issues set out in the office action, applicants respectfully submit that the

claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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